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APPARATUS FOR THE LASER PROCESSING OF WORKPIECES

The invention is directed to an apparatus for the laser processing of workpieces having processing surfaces lying diametrically opposite one another.

In the manufacture of fine surface structures, for example in printed circuit boards, it is known to structure conductive or cover layers with high precision using a laser beam. Given printed circuit boards laminated on both sides, the printed circuit board must be turned over and be brought into the working range of the laser unit a second time.

The invention is based on the object of enhancing the processing precision and shortening the processing duration.

This object is achieved by the invention according to claim 1. Since the two laser units can be controlled independently of one another, different patterns can be generated on the two sides without having to move the printed circuit board, as a result whereof the processing time is cut in half. Moreover, the turnover, change and adjustment outlay for processing the second printed circuit board side is eliminated. The position of the workpiece need only be acquired once. The two laser units can be pre-adjusted such that the processing patterns at both sides of the printed circuit board are congruent without differences.

With the development according to claim 2, different structures can be produced on the two sides of the printed circuit board without employing masks.

The invention is explained in greater detail below on the basis of an exemplary embodiment shown in the drawing. The illustrated Figure 1 shows a schematic side view of a carrying frame 1 with two laser units 1, a workpiece 3 fashioned as printed circuit board and a movable carrier 4 fashioned as linear transport means whose transport direction proceeds perpendicular to the plane of the Figure.

The laser unit 2 is composed of a laser beam generator 5 and of a deflection means 6 with which the laser beam can be deflected such in two coordinate directions that it is respectively perpendicular to the workpiece surface. The two laser units are arranged such above and below the workpiece 3 that their emitted beams are directed opposite one another. Both surfaces of the workpiece 3 cover. [sic] These

can then be simultaneously processed and be subsequently moved to such an extent by the movable carrier 4 that another processing area of the printed circuit board proceeds into the radiation region of the laser unit 2 or until the workpiece 3 has left the laser region.

- 5 The workpiece can, for example, be fashioned as normal printed circuit board wherein individual regions must be especially finely structured. However, it is also possible, for example, to employ a conductive film instead of the printed circuit board and to pull this past between the two deflection device 6 in steps. The workpieces 3 can also, for example, be fashioned as relatively small chip carriers and
- 10 be fixed in a plurality of receptacles of a workpiece carrier that is provided with corresponding clearances for the passage of laser beams. In this case, the carrier 4 seizes the workpiece carrier and guides it such that the individual workpieces successively proceed into the laser beam region.